

Ms LAI: Briefly, we have a plan called "management plan" for the nature reserve in Mai Po as it needs to be operated to make sure the environment suit for the birds. It includes habitat management and monitoring research but we usually focus on monitoring the organisms. One of its parts is related to water quality though we are not experts in it. We will measure those basic parameters connected to the ecosystem, for example, pH value and temperature. We will measure it every two months for reference. We have recently bought spectrophotometer which can show the level of nitrate and phosphate by changing the colours. AFCD also has a programme with more parameters for measuring the water quality.

1. Do you also measure the levels of nitrate and phosphate every two months?

No, owing to our limited manpower, we can only conduct the measurement quarterly.

2. What is the usage of the data (nitrate and phosphate)?

Algal bloom will break out when the water quality is not desirable so we want to see if it is related to the nitrate and phosphate content in water. If so, we can know the alarming level of these chemicals which helps the maintenance.

3. Is it enough for you to predict the algal outbreak if the measurement is carried out every two months?

I don't know as this has been started for a short period of time.

4. As you mentioned before, the reason for conducting the measurement every two months was because of insufficient manpower. Is the machine complicated to use?

Yes. Every time, we have to put chemicals into the water sample [collected from ponds] and wait for the reactions, it spends almost a whole day to sample and wait for the results from all ponds. We can't simply use the probe and obtain the data.

5. Will the data be shown via computer?

No, we need to log it by ourselves. For the latest one, the device with data logger can connect to Bluetooth and analyse the data automatically. However, it is much expensive (around HK\$40,000), so we just have four (not all the places here can be covered) due to

the limited funding.

6. How often will you measure the temperature and pH value?

Every two months. We will use data loggers.

7. How much is it for you to measure the amounts of nitrate and phosphate?

More than ten dollars per each measurement without taking account of the cost of the machine.

8. Do you think it is expensive? Are there any drawbacks?

I think it is expensive, though it is quite user-friendly in analysing the data (easier to calibrate with connection to iPad).

9. Do you often analyse the data by yourselves?

We don't have to. We have some management committee, so some professionals will do us a favour.

10. Have you found any data which can tell you when the alarming level for the algal bloom?

No, as we have done one the measurement up till now.

11. Do you also monitor the condition of the rivers and the ocean?

Yes, when there are new infrastructure developments, we will visit and see whether it is suitable or not.

12. For the conservation of the rivers and oceans, do you need the information of nitrate and phosphate?

I am not the one who is in charge of this. As far as I know, they measure temperature and pH values rather than these.

13. Are you satisfied with the equipment (data loggers)?

Yes, I am. After several measurements, I find that it is really user-friendly and the time required is not that much. However, it is not that accurate (just enough for our use).

14. Do you want any new machines for measuring the concentration of nitrate and

phosphate?

It's good if we have.

15. Was there any algal bloom here before?

Yes, there were. It usually happens from March to April in Gei Wai and the situation goes worse in recent years (1-2). The water will suddenly become green or red.

16. How can you get rid of it?

We can better the situation by letting more fresh water in to replace the contaminated one using our water system.

17. Do you know what microbial biosensor is?

I don't know. I am going to ask you.

Explaining for the microbial biosensors.

18. What is your opinion towards the microbial biosensors which are genetically modified?

If it can response based on the concentration of the compounds by producing fluorescence, it would be convenient. The major concern is we don't know if the microorganisms will be affected or not when there is leakage of the genetically modified bacteria. This is really important as we focus on conservation.

19. Have you ever used this kind of biosensors before?

No, I just heard of some kind of related stuff, for example, using fluorescent fish for detection.

20. We are now working on the microbial biosensor which is able to detect N, P and K. What information would you like to obtain other than N, P and K?

In fact, I don't know.

21. What about toxins or heavy metals?

Both of them will be useful. It depends.

22. Do you need to monitor the amount of bacteria in the ponds?

2015 iGEM HKUST-Rice Team Human Practices
The Exploratory Research on the Study of Stakeholders' Perceptions towards the In-field Use of NPK Microbial Biosensor
Interview Transcript

We don't do it by ourselves as there is no great impact towards our conservation programme. Some researchers will come to count the number of organisms in the mangroves for their projects but it cannot be considered as monitoring. Still, the level of bacteria will hamper the growth of fish and affect the management of *Gei Wai*. It will be perfect if we can obtain those kind of information without devoting too much human power.

Introducing the microbial biosensors we are building in the lab.

23. What characteristics should the microbial biosensors (the one we are building) possess to arouse your interest?

First, the risk should be manageable. Price and time will also be one of the concerns (within our budget). It should be user-friendly, especially for calibration.

24. What factors will make you not consider this microbial biosensor?

Sense and risks as it is opened to the public and monitored by government and monitoring committee.

25. Being a conservation organization, do you think it is suitable to apply some genetically modified microbial biosensor for conservation (e.g. land and ocean)?

It is quite hard to say.

26. Will it offend the law or your values?

I think it is fine for the law in HK. Usually, we are conscious about how to avoid any potential hazards.

27. Other than the factors (safety, price and time) you mention before, what would you consider?

I think these are the main three. We can apply if there is no objection comes from government. By the way, accuracy can also be taken into account.

28. Which one would you prefer for presenting the result, colours or numbers?

In my opinion, numbers will be more objective since there are different definitions of colours for different people.

29. What method would you prefer for conducting the test, collecting water samples or

using test paper?

I believe both of them are fine. Maybe using test paper is better because it can reduce the workload for us.

30. Is it good that the device can be immersed into water for the whole day?

Of course, it can show the changes of each parameters according to the time.

31. Other than predicting the algal bloom, what else can the information help you?

The production of the shrimps and fish have reduced in recent years. Therefore, we want to find out the reasons and lift the production by managing the water quality.

32. If the result shows that the level of N, P and K is too low, what will you do?

We don't know yet. We may add some fertilizers or change our management methods.

33. What is the reason for digging the soil at the bottom of the ponds?

When sea water flushes in, sea animals (fish, small crabs and shrimps) will be pulled in together with soil. After eight to ten years, the water path and ponds will be shallower, so the change of temperature will increase which affects the production of fish, small crabs and shrimps. This is one of the traditional practices in *Gei Wai* but we don't have much scientific support for it. Therefore, we would like to know whether there is any pattern or not by some studies and monitoring.

34. Other than water quality, will you also monitor the soil quality?

We don't conduct any research on soil so far. We mainly focus on the water quality.

35. Do the researchers give you some data back after the testing?

Yes, they will give us the copy.

36. Is the growth of mangroves become worse in these years?

We haven't done any actual research on it but it seems that they are different from the usual pattern.

37. Do you mean the number of mangroves?

Yes.

38. Will you consider the whole system (soil, water, trees...)?

Owing to our limited resources, we can only focus on the major thing (water) though all the elements are tightly connected. With more volunteers, we can work on more area (e.g. plants, animals...).

39. If there is device for testing the soil quality, would you like to try?

We will as it is crucial too. Lots of organisms live there and some birds are really dependent (for food) on that. Thus, the physical parameters are highly important here.